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SOUTHEASTERN FOREST EXPERIMENT STATION

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PART I.--COST ANALYSIS

By

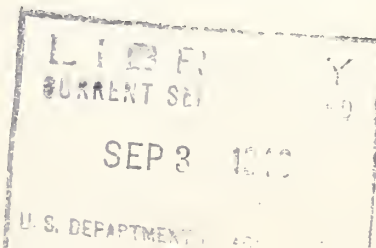
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This cost analysis is based on data collected during the course of a logging operation on the Bent Creek Experimental Forest, near Asheville, North Carolina, in the latter part of 1945 and early 1946. The analysis has been made as an essential part of a logging and milling cost study whose purpose is to provide a sound basis for stumpage appraisal and to indicate the profit or loss that may be expected in logging and milling various sizes and grades of logs or trees. A further function of this cost analysis is to show the amounts and relationships between the various cost items and to indicate the influence of fixed costs in raising cost totals when the actual work-year is reduced below a 250-day standard.

The volume of timber cut included some 525 M bd. ft. of mixed hardwood logs, chiefly oaks.¹ The study area covered 172 acres, of which 35 acres were inoperable because of low merchantable volume or topography. Volume before cutting averaged 5.1 M bd. ft. per acre of operable area, but three-fourths of the volume was removed in the cutting operation. Although the percentage of volume cut was large, few trees below 18 inches in diameter at breast height were taken.

Logging slopes varied from a few percent in the lower coves to 100 percent at the higher elevations, but the average was 30 percent. Elevations ranged from 2800 feet to 3750 feet. The permanent road system leading from the area was better-than-average. It included an improved type of woods road 0.9 mile long, a graded-gravel road 5.9 miles long, and 11.6 miles of asphalt highway to the stationary circular mill where the logs were sawed.

¹/Log volume, throughout the study, was measured by the Scribner Decimal C log rule.



The cost analysis traced all costs from felling and bucking, through skidding, log loading, hauling, unloading, sawmilling, and lumber piling. Costs were carefully accumulated for all operations over periods varying from 4 to 5 months. Actual costs were obtained from actual cost records, although they were modified somewhat for log loading, hauling, and unloading. In the latter case, actual costs were impossible to ascertain accurately, and it was necessary to assume an approximation -- two trucks and drivers working and traveling together, but making only one trip per day each operational day. To bolster the cost data for the Bent Creek operation, supplementary data were obtained from mountain operations in north Georgia.

Contract prices were not considered in determining costs. The saw-mill operator, who purchased the timber, paid a contractor \$4 per M bd. ft. for felling and bucking, \$8 for skidding, and \$12 for log loading, hauling, and unloading. These figures are of general interest, in that they represent the relative judgments and bargaining powers of operator and contractor, but the cost analysis was concerned more with the costs actually involved, not the prices paid.

The presentation of costs includes adjusted as well as actual costs. It should be emphasized that adjusted costs do not refer to any improvement in the standards of work efficiency; they simply represent the costs that could be expected if the work-week was utilized more fully. Except for loading, hauling, and unloading, they assume a 40-hour work-week 50 weeks a year (or 8 hours a day for 250 days a year). In the case of loading, hauling, and unloading, the adjusted cost standard of 250 work days has been retained, but the hours of daily work have been expanded to 9-1/2 to permit two hauling trips each operational day.

Hourly costs were calculated for all operations. Their usefulness lies in the fact that, when combined with time analyses, they permit the calculation of costs per M bd. ft. by species and log and tree sizes.

Hourly costs do not all refer to the same kind of hour. In felling and bucking, the reference is to man-hours where the crew of men is two or three, but predominantly two. In skidding, the reference is to man-hours of teamster or teamster and grabjack time. In loading, the reference is to crew-hours of work where the crew consists of two truck drivers plus one loader operator. In hauling, the reference is to truck-hours where each truck is considered separately. In unloading, the reference is to crew-hours, where the crew consists of two truck drivers. In sawmilling, the reference is to crew-hours, where the saw-mill crew consists of seven men (not including two men in the lumberyard). Lumberyard costs are similarly related to crew-hours of work.

Felling and Bucking

Costs were based on two 2-man crews (or an occasional 3-man crew)^{2/} using ax and crosscut saw. The wage rate used was \$0.60 per hour. Social security was calculated at one percent of the payroll; workman's compensation insurance at 6.18 percent; unemployment taxes at 3 percent. A cost of supervision was assigned on the basis of percentage of total supervision time given by the contractor to the felling and bucking operation.

Actual unit costs were calculated as follows:

Actual Felling & Bucking Costs		
	Cost per M bd. ft., gross log scale	Cost per man-hour of operation
1. Direct costs		
a. Labor		
(1) Wages	\$ 3.29	\$ 0.60
(2) Social security	.03	.01
(3) Workman's compensation insurance	.20	.04
(4) Unemployment taxes	.10	.02
Total labor	<u>\$ 3.62</u>	<u>\$ 0.67</u>
b. Tools and supplies	.12	.02
2. Supervision	.76	.14
Total costs	<u><u>\$ 4.50</u></u>	<u><u>\$ 0.83</u></u>

To adjust costs to a 250-day work-year, the only requirement is to cut the cost of supervision in half. This reduces total unit costs to \$4.12 per M bd. ft. or \$0.76 per man-hour of operation.

Camp construction and kitchen costs, which ordinarily would be charged against felling and bucking and skidding, were deducted from wages. E.g., of the \$3.29 per M bd. ft., which was the total unit labor wage of felling and bucking, \$2.07 was retained by the contractor to cover costs of room and board, and only \$1.22 was actually paid in

^{2/} The 3-man crew worked only 4 days. Its relative inefficiency was shown by the fact that time in man-hours per unit of volume was 33 percent greater than after the crew was reduced to two men.

the form of cash. If the cost of room and board appears excessively high, it is a result of the high proportion of idle days on which no trees were felled and bucked. Kitchen costs assignable to felling and bucking were actually \$1.70 per M bd. ft. but, on an adjusted basis, could have been reduced to \$1.30. Camp construction costs amounted to \$0.37 per M bd. ft., both on an actual and adjusted basis. On a man-hour basis, actual kitchen costs amounted to \$0.34; adjusted costs were calculated at \$0.24.

Skidding

Skidding cost data were obtained from an operation in which slopes ranged up to 100 percent and averaged 30 percent. Distances ranged up to 1,000 feet and averaged 167 feet.

Costs were based on the use of two teams of horses, two teamsters, occasionally a grabjack, and such swamping labor as was necessary to clear skid trails and to prepare log landings.^{3/} A cost of supervision was assigned on the basis of percentage of supervision time given by the contractor to the skidding operation. Wage rates were calculated at \$0.75 per man-hour for teamsters, \$0.60 per man-hour for swamper and grabjack. Social security was calculated at one percent of the payroll; workman's compensation insurance at 6.18 percent; unemployment taxes at 3 percent.

Team costs averaged \$21.23 weekly per team, of which \$1.54 was for team depreciation, \$0.23 for harness depreciation, \$17.37 for feed, and \$2.09 for supplies. Tools, including axes, peavies, grabhammer, saw, files, and grabs, cost \$5.62 per month for each skidding crew.

Actual costs per unit of volume and time were calculated as follows:

^{3/} The work necessary to clear trails and landings for each skidding team required only 58 percent of a swamper's full time. As a result, the swamper worked more or less independently of his skidding crew and filled in on other jobs.

		Actual Skidding Costs	
		Cost per M bd. ft., gross log scale	Cost per man-hour of operation ^{4/}
1. Direct costs			
a. Labor			
(1) Wages			
(a) Teamster & sometimes grabjack	\$ 2.38		\$ 0.72
(b) Swamper	1.14		.35
(2) Social security	.04		.01
(3) Workman's comp. insurance	.22		.07
(4) Unemployment taxes	.10	\$ 3.88	.03
			\$ 1.18
2. Other direct costs			
a. Team			
(1) Depreciation	0.13		0.05
(2) Feed	1.28		.41
(3) Supplies	.16	1.57	.05
			.51
b. Tools and supplies		.11	.03
3. Supervision		.76	.23
	Total costs	<u>\$ 6.32</u>	<u>\$ 1.95</u>

The calculation of hourly costs were based on a teamster working without the aid of a grabjack 84 percent of the time. But because a grabjack helped the teamster 16 percent of the time, cost figures were slightly higher than they would have been otherwise. An analysis of results from the two systems -- teamster versus teamster and grabjack -- revealed that the crew-hours required per unit of volume were slightly less when a 2-man crew was used, but that costs were slightly more.

Costs, adjusted to a 250-day work-year, are listed as follows:

^{4/}Man-hour of teamster or teamster and grabjack labor. Swamping is included in the man-hour cost shown.

Adjusted Skidding Costs			
Cost per M bd. ft., gross log scale		Cost per man-hour of operation ^{5/}	

1. Direct costs

a. Labor

(1) Wages

(a) Teamster & sometimes
grabjack

\$ 2.38

\$ 0.72

(b) Swamper

1.14

.35

(2) Social security

.04

.01

(3) Workman's comp. insurance

.22

.07

(4) Unemployment taxes

.10

\$ 3.88

.03

\$ 1.18

2. Other direct costs

a. Team

(1) Depreciation

0.11

0.03

(2) Feed

1.08

.35

(3) Supplies

.16

1.35

.05

.43

b. Tools and supplies

.11

.03

3. Supervision

.56

.17

Total costs

\$ 5.90

\$ 1.81

Camp construction and kitchen costs, which ordinarily would be charged against skidding as well as felling and bucking, were deducted from wages. E.g., of the \$3.52 per M bd. ft., which was the total unit labor wage of skidding, \$1.42 was retained by the contractor to cover costs of board and room, and only \$2.10 was actually paid in the form of cash. Kitchen costs assignable to skidding were actually \$1.14 per M bd. ft. but, on an adjusted basis, could have been reduced to \$0.96. Camp construction costs amounted to \$0.28 per M bd. ft., both on an actual and adjusted basis. On a crew-hour basis, kitchen costs amounted to \$0.78; adjusted costs were calculated at \$0.67.

^{5/} Man-hour of teamster or teamster and grabjack labor. Swamping is included in the man-hour cost shown.

Log Loading

A machine loader^{6/} was set up successively at each of the log dumps for loading logs onto the two trucks used for hauling. Ten settings were required for the whole operation. The two truck drivers worked together as a team and cooperated in loading the two trucks. A third man, usually the contractor, operated the loader.

The wage rate for the machine operator was calculated at \$0.65. When the contractor operated the loader, this wage calculation was made in addition to the supervision cost which was assignable to the loading operation.

For each truck and driver, fixed costs were computed for a whole day -- including loading, hauling, and unloading -- and equal hourly costs were assigned to all three operations. For one round trip per day including loading, hauling, and unloading, a standard which was accepted to represent average actual costs, the time required was 4-3/4 hours. For two round trips per day, the standard accepted for adjusted costs, the time required was 9-1/2 hours. In the latter case, instead of the regular wage rate of \$0.60 per hour for truck drivers, the rate for the last 1-1/2 hours had to be calculated at time-and-a-half.

Average load volume was 1.5 M bd. ft. for each truck. On a unit volume basis, one M bd. ft., actual costs were calculated as follows:

	<u>Actual loading cost per M bd. ft., gross log scale</u>	
1. Labor cost		
a. Wages -- 2 truck drivers and 1 loader operator	\$ 0.90	
b. Social security	.01	
c. Workman's compensation insurance	.03	
d. Unemployment taxes	<u>.03</u>	\$ 0.97
2. Other direct costs		
a. Loader		
(1) Installation	0.32	
(2) Depreciation	.08	
(3) Repairs and supplies	.02	
(4) Fuel and oil	<u>.14</u>	.56

^{6/} Tongs, attached to a 150-foot cable, were suspended from an A-pole frame. Power was furnished by an old automobile engine. The whole loading unit was valued at no more than \$300, and annual depreciation was calculated at \$60. Annual repairs and supplies have been estimated at 10 percent of initial investment, or \$30.

		Actual loading cost per M bd. ft., gross log scale
Brought forward		\$ 1.53
b. Truck and investment		
(1) Depreciation		
(a) Truck		\$ 0.28
(b) Trailer		.06
(2) Financing charges		.04
(3) License, taxes, insurance		<u>.04</u>
		.42
3. Supervision		<u>.46</u>
Total costs		<u>\$ 2.41</u>

Costs, adjusted to a 9-1/2-hour work-day for 250 days per year, are listed below:

		Adjusted Loading Costs	
		Cost per M bd. ft., gross log scale	Cost per hour ^{7/} of operation
1. Labor cost			
a. Wages - 2 truck drivers & 1 loader operator		\$ 0.97	\$ 1.95
b. Social security		.01	.02
c. Workman's comp. insurance		.03	.06
d. Unemployment taxes		<u>.03</u>	<u>.06</u>
		\$ 1.04	\$ 2.09
2. Other direct costs			
a. Loader			
(1) Installation		0.32	0.64
(2) Depreciation		.04	.08
(3) Repairs and supplies		.02	.04
(4) Fuel and oil		<u>.14</u>	<u>.27</u>
		.52	1.03
b. Truck investment - 2 trucks			
(1) Depreciation			
(a) Truck		0.14	0.28
(b) Trailer		.03	.06
(2) Financing charges		.02	.04
(3) License, taxes, insurance		<u>.02</u>	<u>.04</u>
		.21	.42
3. Supervision		<u>.23</u>	<u>.46</u>
Total costs		<u>\$ 2.00</u>	<u>\$ 4.00</u>

^{7/}Hourly cost refers to the time of loading either truck. While one truck is being loaded, the other stands idle.

Log Hauling

The cost analysis has been based on the use of two new trucks (1-1/2 tons) with trailers. For each truck and driver, daily fixed costs were computed^{8/} and assigned equally to all hours of the work day, whether the time applied to log loading, hauling, or unloading.

Truck running expenses were charged wholly against the hauling operation. On the assumption of a fully utilized work day, involving two trips and a travel distance of 74.6 miles, daily running expenses totaled \$7.24 per truck.^{9/} Average hauling time was 5-1/2 hours per day and this time period was used for computing adjusted hourly costs. In the calculation of actual costs, an approximation was made in assuming two trucks traveling together but making only one round trip per day. The average truck load was 1.5 M bd. ft.

Road construction costs included the building and upkeep of 0.4 mile of truck road and 0.1 mile of improved skid trail, and the rebuilding of two small wood bridges. All of these costs were charged against the hauling operation. Cost of supervision was assigned on the basis of percentage of supervision time given by the contractor to the hauling operation.

Actual unit costs were summarized as follows:

	<u>Actual hauling cost per M bd. ft., gross log scale</u>	
1. Labor costs		
a. Wages - truck driver	\$ 1.90	
b. Social security	.02	
c. Workman's compensation insurance	.06	
d. Unemployment taxes	<u>.06</u>	\$ 2.04

^{8/} Truck costs were based on an anticipated life of 350 working days. Depreciation of each truck (without tires) was calculated at \$1.29 per operational day; trailer depreciation (without tires) was calculated at \$0.29 per operational day. For each truck and trailer, financing charges were carried at \$0.20 per operational day, and license, taxes, and insurance were carried at \$0.20 per day. Each driver's wage was calculated at \$0.60 per hour for the first 8 hours, \$0.90 per hour for the last 1-1/2 hours of an adjusted day, making a total of \$6.15 per day or an average of \$0.65 per hour.

^{9/} Tires for each truck and trailer cost \$3.73 per day; gasoline cost \$2.24; oil, \$0.22; lubrication, \$0.30; repair labor and supplies, \$0.75.

		<u>Actual hauling cost per M bd. ft., gross log scale</u>	
1. Labor costs (brought forward)		\$	2.04
2. Other direct costs			
a. Truck and trailer			
(1) Running expenses			
(a) Tires	\$ 1.24		
(b) Gasoline	.74		
(c) Oil and lubrication	.17		
(d) Repair labor and supplies	.25	2.40	
(2) Investment costs			
(a) Depreciation - truck	.86		
(b) Depreciation - trailer	.20		
(c) Financing charges	.14		
(d) License, taxes, insurance	.14	1.34	
b. Road costs			
(1) Depreciation	1.26		
(2) Repairs	.16	1.42	
3. Supervision			.76
All costs		\$	<u>7.96</u>

Costs, adjusted to a 9-1/2-hour work-day for 250 days per year, are listed below:

		<u>Adjusted Hauling Costs</u>	
		<u>Cost per M bd. ft., gross log scale</u>	<u>Cost per hour of operation ^{10/}</u>
1. Labor costs			
a. Wages - truck driver	\$ 2.05	\$	0.65
b. Social security	.02		.01
c. Workman's comp. insurance	.07		.02
d. Unemployment taxes	.06	\$ 2.20	.02 \$ 0.70
2. Other direct costs			
a. Truck and trailer			
(1) Running expenses			
(a) Tires	1.24		0.68
(b) Gasoline	.74		.41
(c) Oil & lubrication	.17		.09
(d) Repair labor and supplies	.25	2.40	.14 1.32

^{10/} Hourly cost refers to the cost of each of two trucks.

		Adjusted Hauling Costs	
		Cost per M bd. ft., gross log scale	Cost per hour of operation
Brought forward		\$ 4.60	\$ 2.02
(2) Investment costs			
(a) Depreciation - truck	\$ 0.43		\$ 0.14
(b) Depreciation - trailer	.10		.03
(c) Financing charges	.07		.02
(d) License, taxes, insurance	.07	.67	.02
			.21
b. Road costs			
(1) Depreciation	1.26		.69
(2) Repairs	.16	1.42	.09
			.78
3. Supervision		.38	.21
Total costs		\$ 7.07	\$ 3.22

Log Unloading

Unloading required an average of 30 minutes. Only 15 minutes were needed to unload each truck, but an equal period of truck idleness was enforced while the other truck was unloaded.^{11/}

The fixed cost for each truck and driver was the same on an hourly basis for the loading, hauling, and unloading operations. (This cost was described in the section on Log Hauling.) An additional cost of supervision might have been assigned to unloading, but the amount was very small and it was not separated from the charges against hauling. Similarly, the cost of truck and trailer repair was considered too slight to require separation from hauling costs.

Actual unit costs were summarized as follows:

^{11/} The two trucks arrived at the mill together but each driver helped the other to unload.

Actual unloading cost per
M bd. ft., gross log scale

1. Labor costs

a. Wages - 2 truck drivers	\$ 0.20	
b. Social security)		
c. Workman's compensation insurance)	.01	
d. Unemployment taxes)		\$ 0.21

2. Investment costs

a. Depreciation - 2 trucks	0.09	
b. Depreciation - 2 trailers	.02	
c. Financing charges)	.03	
d. License, taxes, insurance)		.14
Total costs		<u>\$ 0.35</u>

Costs adjusted to 250 fully utilized work days per year are listed below:

	<u>Cost per M bd. ft., gross log scale</u>	<u>Cost per hour^{12/} of operation</u>
1. Labor costs		
a. Wages - 2 truck drivers	\$ 0.22	\$ 1.30
b. Social security)		.01
c. Workman's comp. insurance)	.01	.04
d. Unemployment taxes)	<u>\$ 0.23</u>	<u>.04</u> \$ 1.39
2. Investment costs		
a. Depreciation - 2 trucks	0.05	0.28
b. Depreciation - 2 trailers	.01	.06
c. Financing charges)	.01	.04
d. License, taxes, insurance)	<u>.07</u>	<u>.04</u> <u>.42</u>
Total costs	<u>\$ 0.30</u>	<u>\$ 1.81</u>

^{12/} Hourly cost refers to the time of unloading either truck. While one truck is being unloaded, the other stands idle.

Sawmilling

The sawmill, on which the cost analysis was based, was a No. 7 Wheeland stationary type, powered with a Diesel engine (80 h.p., 300 r.p.m.).^{13/} The mill was equipped with a circular headsaw, usually 48 inches in diameter, a gang edger (3 saws), a trimmer (2 saws), a swing cut-off saw, and a small skidder for hauling logs from the yard to the deck.

Seven men were required to run the mill.^{14/} Usually, the mill superintendent served as one of the mill hands in addition to his management duties, and in this case, his labor was calculated in with the other labor costs. Three men worked at \$0.75 per hour; the others received a wage rate of \$0.60. Supervision cost was assigned to milling on the basis of payroll division between sawmilling and lumberyard operations. Administrative overhead was relatively low because the mill was only one of several mills under one management; the cost was distributed between sawmilling and lumberyard operations on the basis of total cost of each operation.

Depreciation of mill equipment was carried at \$789 annually. Annual general taxes on the mill were \$26. Fire insurance totaled \$262.50. Rent was a nominal charge amounting to \$20 per month for mill site and yard. Assigned on the basis of mill and yard value, mill rent was \$11 per month.

Actual unit costs were calculated as follows:

	<u>Actual sawmilling cost per M bd. ft., lumber tally</u>	
1. Direct costs		
a. Labor		
(1) Wages	\$ 6.32	
(2) Social security	.06	
(3) Workman's compensation insurance	.21	
(4) Unemployment taxes	.19	\$ 6.78

^{13/} Following a breakdown of the old engine during the course of the study, it was replaced by a new Murphy Diesel Engine of 150 h.p. Hourly mill costs remained the same, but as a result of increased mill efficiency, unit volume costs were reduced 7 percent.

^{14/} The seven men included a sawyer, dog setter, edgerman, trimmer-man, cut-off sawyer, lumber sorter, and log yardman.

	<u>Actual sawmilling cost per M bd. ft., lumber tally</u>	
Brought forward		\$ 6.78
b. Other direct costs		
(1) Operating supplies	\$ 0.53	
(2) Maintenance labor and repairs	1.06	
(3) Depreciation	.46	
(4) Fire insurance and general taxes	<u>.17</u>	2.22
2. Indirect or overhead costs		
a. Supervision	0.69	
b. Administrative overhead	.68	
c. Land rent	<u>.08</u>	1.45
Total costs		<u>\$ 10.45</u>

Costs, adjusted to a 250-day work-year, are presented below:

		<u>Adjusted Sawmilling Costs</u>	
		<u>Cost per M bd. ft., lumber tally</u>	<u>Cost per hour of mill operation</u>
1. Direct costs			
a. Labor			
(1) Wages	\$ 6.24	\$ 6.07	
(2) Social security	.06	.06	
(3) Workman's comp. insurance	.18	.18	
(4) Unemployment taxes	<u>.17</u>	<u>\$ 6.65</u>	<u>.17</u> \$ 6.48
b. Other direct costs			
(1) Operating supplies	0.53	0.51	
(2) Maintenance labor & repairs	1.06	1.03	
(3) Depreciation	.40	.39	
(4) Fire insurance & general taxes	<u>.15</u>	<u>2.14</u>	<u>.14</u> 2.07
2. Indirect or overhead costs			
a. Supervision	0.61	0.59	
b. Administrative overhead	.61	.60	
c. Land rent	<u>.07</u>	<u>1.29</u>	<u>.07</u> 1.26
Total costs		<u>\$10.08</u>	<u>\$ 9.81</u>

Lumberyard Costs

Two men were employed regularly in moving lumber on small carts from the mill platform to the yard and piling the lumber for air seasoning. Their wage rate was \$0.60 per hour. Supervision cost was assigned to the lumberyard on the basis of payroll division between sawmilling and lumberyard operations. Administrative overhead was distributed on the basis of total cost of each operation.

Depreciation of yard equipment was calculated at \$790 annually. Annual fire insurance on the lumberyard was \$60. General taxes were \$21. Rent, distributed between mill site and yard on the basis of mill and yard value, amounted to only \$9 per month for the mill yard.

Actual unit costs are presented below:

	<u>Actual lumberyard costs per M bd. ft., lumber tally</u>	
1. Direct costs		
a. Labor		
(1) Wages	\$ 1.96	
(2) Social security	.02	
(3) Workman's comp. insurance	.06	
(4) Unemployment taxes	.06	\$ 2.10
b. Other direct costs		
(1) Operating supplies	0.13	
(2) Maintenance labor and repairs	.34	
(3) Depreciation	.46	
(4) Fire insurance and general taxes	.05	.98
2. Indirect or overhead costs		
a. Supervision	0.21	
b. Administrative overhead	.28	
c. Land rent	.06	.55
Total costs		<u>\$ 3.63</u>

Costs adjusted to a 250-day work-year were calculated as follows:

		Adjusted Lumberyard Costs	
		Cost per M bd. ft., lumber tally	Cost per hour of mill operation
1. Direct costs			
a. Labor			
(1) Wages		\$ 1.96	\$ 1.91
(2) Social security		.02	.02
(3) Workman's comp. insurance		.06	.06
(4) Unemployment taxes		<u>.06</u> \$ 2.10	<u>.06</u> \$ 2.05
b. Other direct costs			
(1) Operating supplies		0.13	0.13
(2) Maintenance labor & repairs		.34	.33
(3) Depreciation		.40	.39
(4) Fire insurance & general taxes		<u>.04</u> .91	<u>.04</u> .89
2. Indirect or overhead costs			
a. Supervision		0.19	0.18
b. Administrative overhead		.21	.21
c. Land rent		<u>.06</u> .46	<u>.05</u> .44
Total costs		<u>\$ 3.47</u>	<u>\$ 3.38</u>

Summary of Costs

Actual costs and costs adjusted to a 250-day work-year for all operations from felling and bucking to piled green lumber are summarized briefly in the following tabulations:

	Costs per M bd. ft., gross log scale			
	Actual		Adjusted	
Felling and bucking	\$ 4.50		\$ 4.11	
Skidding	<u>6.32</u>	\$ 10.82	<u>5.90</u>	\$ 10.01
Loading	2.41		2.00	
Hauling	7.96		7.07	
Unloading	<u>.35</u>	10.72	<u>.30</u>	9.37
Sawmilling	10.62		10.24	
Lumberyard (piling)	<u>3.69</u>	<u>14.31</u>	<u>3.53</u>	<u>13.77</u>
Total cost, green lumber		<u>35.85</u>		<u>33.15</u>

Costs per M bd. ft., lumber tally				
Actual			Adjusted	
Felling and bucking	\$ 4.43		\$ 4.04	
Skidding	<u>6.22</u>	\$ 10.65	<u>5.81</u>	\$ 9.85
Loading	2.37		1.97	
Hauling	7.83		6.96	
Unloading	<u>.34</u>	10.54	<u>.29</u>	9.22
Sawmilling	10.45		10.08	
Lumberyard (piling)	<u>3.63</u>	<u>14.08</u>	<u>3.47</u>	<u>13.55</u>
Total cost, green lumber		<u>\$ 35.27</u>		<u>\$ 32.62</u>

